REMARKS

The above Amendments and these Remarks are in reply to the Office Action mailed April 23, 2004.

Currently, claims 1-6, 8 - 26 are pending. Applicants respectfully request reconsideration of claims 1-6, 8 - 26.

I. Summary of the Examiner's Objections

Claims 1-6, 8-16, and 19-22 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 3, 4, and 17 were rejected under 35 USC §102(a) as being anticipated by Molero et al.

Claims 1, 3, 4, and 17 were rejected under 35 USC §102(e) as being anticipated by Bhaskaran.

Claims 19-22 were rejected under 35 USC §103(a) as being unpatentable over Bhaskaran, in view of Jindal et al.

Claims 2, 5, 6, 8-16, 18, and 23-26 were rejected under 35 USC §103(a) as being unpatentable over Bhaskaran, in view of Jindal, and further in view of Ito et al.

II. Summary of the Amendments

Applicants have amended claims 1, 8, 9, 11, 15, 17, 19, and 23.

II. Remarks

A. Rejections Under 35 USC §112.

The claims have been amended to clarify the claims in light of the rejection over 35 USC §112. It is respectfully submitted the claims now particularly point out and distinctly claim the invention.

B. Rejections Based on Prior Art.

Claims 1 - 6 and 17

It is respectfully submitted that claims 1 and 17 and the claims depending therefrom are not anticipated by Molero et al. or Bhaskaran.

Claim 1 has been amended to define that a target comprises: "... a mirrored virtual target or a physical storage device..." and further define the step of "...receiving at said at least one port, a plurality of storage input/output requests...". Finally, the step of "providing" has been amended to clarify that the paths are "... request paths over the network to the target from the switch", which is supported by the plurality of paths shown in Figure 13A and 13B of the application.

It is respectfully submitted that Molero refers to packet switching and path load balancing. IP network packet switching and network routing load balancing is significantly different from balancing storage input output requests received, rather than packets. In Molero, the illustrated switches are concerned with IP routing:

> An internal crossbar provides full connectivity between input buffers and output links. It is configured by the routing and arbitration unit, which is responsible for implementing the routing algorithm and selecting an output link for the incoming message....The routing unit polls input ports, in a round-robin scheduling policy, in order to route new arrived messages.
>
> ... messages are broken up into flits, which represent the flow control unit. In wormhole switching, messages are pipelined through the network at the flit level. Molero, p. 485, section 21, paragraphs1-2.

The present system distinguishes between IP packet systems and storage requests:

> ...dropping a request in a storage system is unacceptable, unlike conventional network communication system, where a request may include one or more packets. In one embodiment, a request includes all packets

> sent back and forth from initiator to target until the request is complete, e.g., an iSCSI command PDU, an iSCSI R2T, an iSCSI write data PDU, and an iSCSI response PDU will form a single request. Application, paragraph 0109.

Hence, in the invention as defined in claim 1 claims route the "request", and the load balancing is done for I/O requests not packets. I/O requests follow a request - response protocol and operate at a higher protocol level than packet switching.

Likewise Bhaskaran is concerned with IP routing:

> The present invention provides a network flow switch (and a method of operation thereof)for connecting a pool of IP routers to a cluster of IP servers sharing a single IP address, without requiring translation of the IP address, and providing bi-directional clustering. Bhaskaran, Col. 3, lines 45-50.

Hence, it is respectfully submitted that Molero and Bhaskaran do not anticipate a method calling for:

> providing a plurality of request paths over the network to the target from the switch, each path passing through at least one port of the switch;
> receiving at said at least one port, a plurality of storage input/output requests;

It is further respectfully submitted that claims 3 and 4, dependent on claim 1, are likewise not anticipated by Molero and Bhaskaran as such claims are dependent from and include all the limitations of claim 1.

Claims 2 and 5 were rejected under 35 USC §103 as obvious over Bhaskaran in view of Jindal and further in view of Ito. Claims 2 and 5 are dependent from claim 1 and include all the limitations of claim 1. As noted above, the invention as defined in claim 2 and 5 includes steps calling for:

> providing a plurality of request paths over the network to the target

from the switch, each path passing through at least one port of the switch;
receiving at said at least one port, a plurality of storage input/output requests;

Jindal teaches DNS request load balancing. It is respectfully submitted that Jindal would not lead one of average skill in the art to construct the invention as defined in claim 2. Jindal teaches a central server and server farm concept of deployment for "replicated services", such as DNS. In contrast, storage targets are unique storage devices with multiple paths between them and the switch, as defined in claim 1 and claims 2 and 5 dependent therefrom. Hence, one of average skill in the art would not be led to combine the teachings of Jindal with those of Bhaskaran to derive the invention as defined in claims 2 and 5.

Ito is cited by the Examiner for the teaching of using a "shortest average response time to determine which server to select in a load balancing system" to provide a teaching lacking in the combination of Bhaskaran and Jindal.

Nevertheless, Ito deals with database server response times in response to SQL requests. There is no teaching of processing "storage input/output requests", as required by the steps in the method of the present invention.

Hence, it is respectfully submitted that claims 2 and 5 are not obvious over Bhaskaran in view of Jindal and Ito.

It is further respectfully submitted that claim 17 is not anticipated by Bhaskaran or Molero. Claim 17 includes limitations calling for:

... a plurality of paths between the switch and a target,
..means for load balancing amongst the paths using said processing circuitry associated with each of said ports, said means including means for

> receiving a plurality of storage input/output requests at said plurality of ports and passing the storage input/output request received by the switch from the initiator to the target along the path with the shortest average response time.

In *In re Donaldson*, 16 F.3d 1189, 1193 (CAFC 1994), *en banc*, the Court stated:

> [t]he plain and unambiguous meaning of paragraph six is that one construing means-plus-function language in a claim must look to the specification and interpret that language in light of the corresponding structure, material, or acts described therein, and equivalents thereof, to the extent that the specification provides such disclosure. Paragraph six does not state or even suggest that the PTO is exempt from this mandate... *Id.* at 1193.

Under *Donaldson*,

> the "broadest reasonable interpretation" that an examiner may give means-plus-function language is that statutorily mandated in paragraph six. Accordingly, the PTO may not disregard the structure disclosed in the specification corresponding to such language when rendering a patentability determination. *Id.* at 1194-1195.

It is respectfully submitted that there is no corresponding structure in Bhaskaran or Molero which meets the limitations calling for a "means for receiving a plurality of storage input/output requests at said plurality of ports and passing the storage input/output request received by the switch from the initiator to the target along the path with the shortest average response time." Indeed, the Examiner even admits that Bhaskaran and Molero do not teach using the shortest average response time.

The specific teachings of Bhaskaran and Molero are discussed at length above, and it is once again noted that neither deals with load balancing storage input/output requests amongst a plurality of paths between a target and a switch.

Hence, it is respectfully submitted that claims 17 is not anticipated by Bhaskaran and Molero. Reconsideration of claims 1-6 and 17 is therefore respectfully requested.

Claims 8 – 16 and 18

Independent claims 8-16 and 18 were rejected as obvious over Bhaskaran in view of Jindal and Ito. Each of claims 8 – 16 and 18 includes limitations similar to those in claim 1 with respect to processing of "storage input/output requests" and paths "from the storage device to the switch" or "from the switch to each member of the mirrored virtual target." For the reasons set forth above with respect to claims 2 and 5, it is respectfully submitted claims 8 – 16 and 18 are not obvious over Bhaskaran in view of Jindal and Ito.

Claim 8 now includes the limitation calling for:

> providing a plurality of storage input/output request paths over the network from the storage device to the switch, each path passing through at least one port of the switch;
> receiving a plurality of storage input/output requests at least one port:
> passing a storage input/output request received by the switch from the initiator to the member with the shortest average response time using said affiliated processing circuitry.

Claim 9 calls for:

> providing a plurality of request paths from the switch to each member of the mirrored virtual target via a network,;
> receiving a plurality of storage input/output requests at least one port:
> ...
> passing a storage input/output request received by the switch from the initiator to the member with the shortest average response time using said affiliated processing circuitry.

Likewise claim 11 calls for:

> providing a plurality of storage request paths between a switch and a physical storage device from a first initiator
> receiving a plurality of storage input/output requests at least one port, at least a first request being from the initiator to the physical storage device and at least a second request from the initiator to the member of the mirrored target:

And claim 15 calls for:

> passing a storage level input/output request received by the switch from the initiator to the target along the path with the shortest average response time using said circuitry

Such limitations are similar to those set forth above with respect to claims 1, 2 and 5. Claims 9 – 10, 12 – 15 are all dependent upon and include all the limitations of claims 8 and 11. For the reasons set forth above, it is respectfully submitted such claims are not obvious over Bhaskaran in view of Jindal and Ito.

Claims 19 – 22

It is respectfully submitted that claims 19 – 22 are not obvious over Bhaskaran in view of Jindal. Claim 19 includes limitations calling for:

> a plurality of storage input/output request routing paths from the switch to the target over a network, wherein the switch includes statistical information regarding the response time for each path; and
>
> wherein the switch is designed to forward a storage level input/output request from the initiator to the target along the path with the shortest response time to other storage level requests using processing circuitry affiliated with each of the ports.

As noted above with respect to claim 1, Bhaskaran and Jindal do not deal with processing of storage input/output requests. The specific teachings of Jindal and Bhaskaran are discussed at length above.

Claims 20 – 22 are dependent from and include all the limitations of claim 19. For the reasons set forth above with respect to claims 1, 2 and 5, is it respectfully submitted claims 19 – 22 are not obvious over Bhaskaran in view of Jindal.

Claims 23 - 26

It is respectfully submitted that claim 23 – 24 are not obvious over Bhaskaran in view of Jindal. Claim 23 includes limitations calling for

> providing a plurality of paths to a target from the switch over a network coupling the storage switch, target and initiator, each path passing through at least one of a plurality of ports of the switch;
>
> receiving at said at least one port, a plurality of storage input/output requests;
>
> determining a respective response time of each path using processing circuitry affiliated with said at least one of the plurality of ports;
>
> passing the storage input/output request received by the switch from the initiator to the target along the path with the shortest average response time.

As noted above with respect to claim 1, Bhaskaran and Jindal do not deal with processing of storage input/output requests. The specific teachings of Jindal and Bhaskaran are discussed at length above.

Claims 24 – 26 are dependent from and include all the limitations of claim 23. For the reasons set forth above with respect to claims 1, 2 and 5, is it respectfully submitted claims 23 – 26 are not obvious over Bhaskaran in view of Jindal.

Examiner Interview

The Examiner is thanked for the opportunity to discuss an earlier draft of the claims. During the interview, the Examiner expressed a desire to clarify the nature of the path. The claims have been amended to address this subject. As is clear from Figs 13A and 13B, a "path" connects the storage switch to a storage device which has one or more virtual target. One storage device may support one or more paths, so a path may lead to the same or different storage devices.

Based on the above amendments and these remarks, reconsideration of claims 1-6 and 8 – 26 is respectfully requested.

The Examiner's prompt attention to this matter is greatly appreciated. Should further questions remain, the Examiner is invited to contact the undersigned attorney by telephone.

Enclosed is a PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136 for extending the time to respond up to and including today, October 25, 2004.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 501826 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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